

# Economic Issues for an Isolated Facility

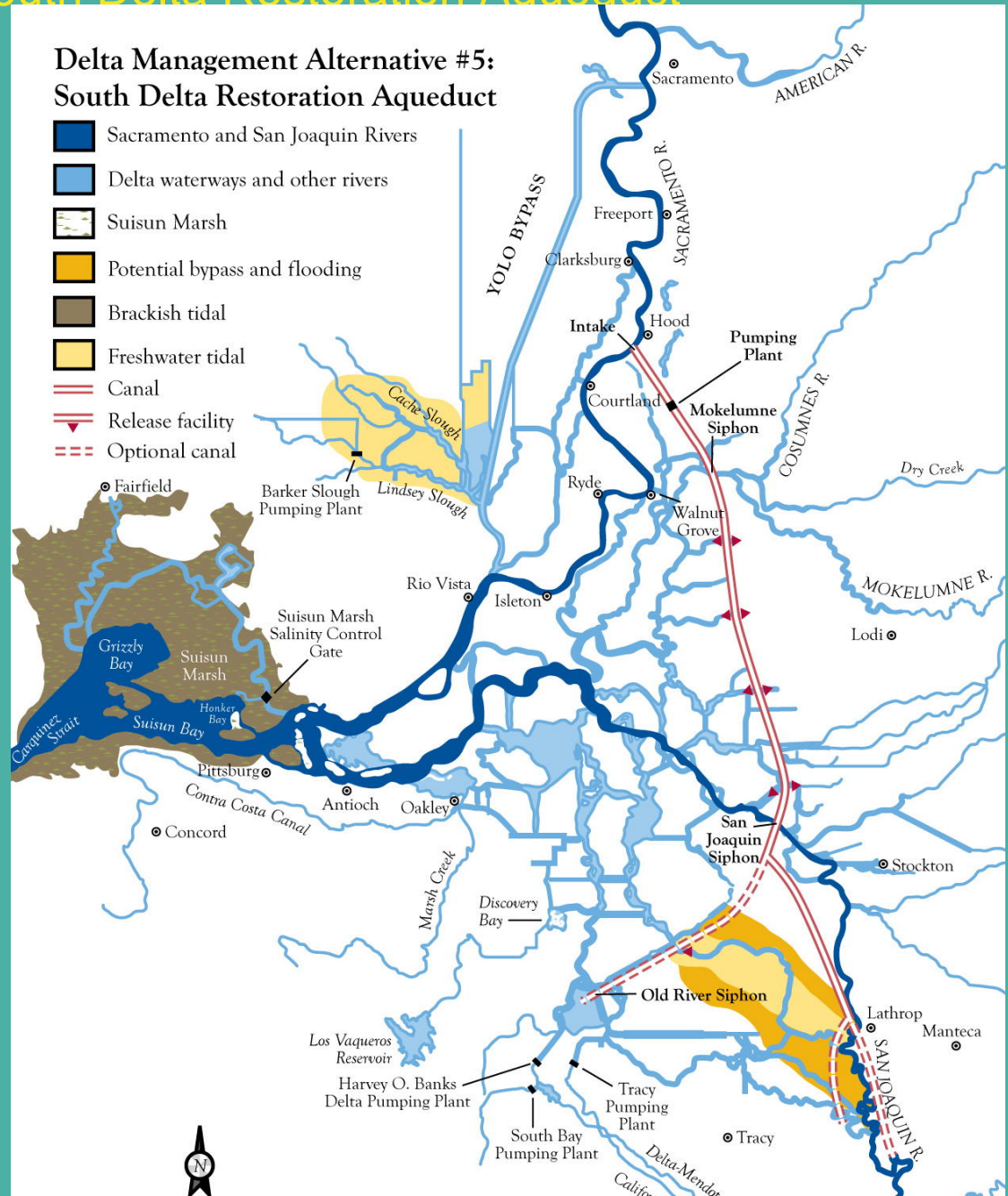
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# South Delta Restoration Aqueduct

- Main rivers
- Delta waterways
- == Canal
- ▲— Release facility
- Brackish tidal area
- Freshwater tidal area
- - - Optional canal



# Economic Characteristics of an Isolated Facility (IF)

- An IF has both Public and Private Beneficiaries
- An IF has a decreasing marginal cost
- “Beneficiary pays” means that revenue from private users has to cover their allocated costs
- Private beneficiaries differ greatly in their demands for water
- Point– Standard marginal cost pricing is not applicable to IF cost recovery

# Differences among Private IF Beneficiaries

- Quantities demanded at current prices are very different
  - Agriculture 3.5 MAF
  - M & I 1.5 MAF
- Current Prices
  - Agriculture \$65- AF
  - M & I \$450- AF
- Demand elasticities differ
  - Agriculture -0.75
  - M & I -0.20
- Importance of reliability of supply differs

# Economic Approach

- Long established economic theory shows that differential pricing to users is efficient under the conditions above. Ramsey et al
- Problem- if capacity purchase prices differ by users, subsequent transfers need to be restricted.
- Given the future uncertainty in the Californian economy, environmental values, and climate change, use rights for an IF must be tradable among different users.

# Some economic problems

- How do you get the beneficiaries to pay?
- How do you size the capacity of the Facility?
- How do you allow future adjustment by trading rights without giving windfall gains?

# Traditional Project Sizing and Costing

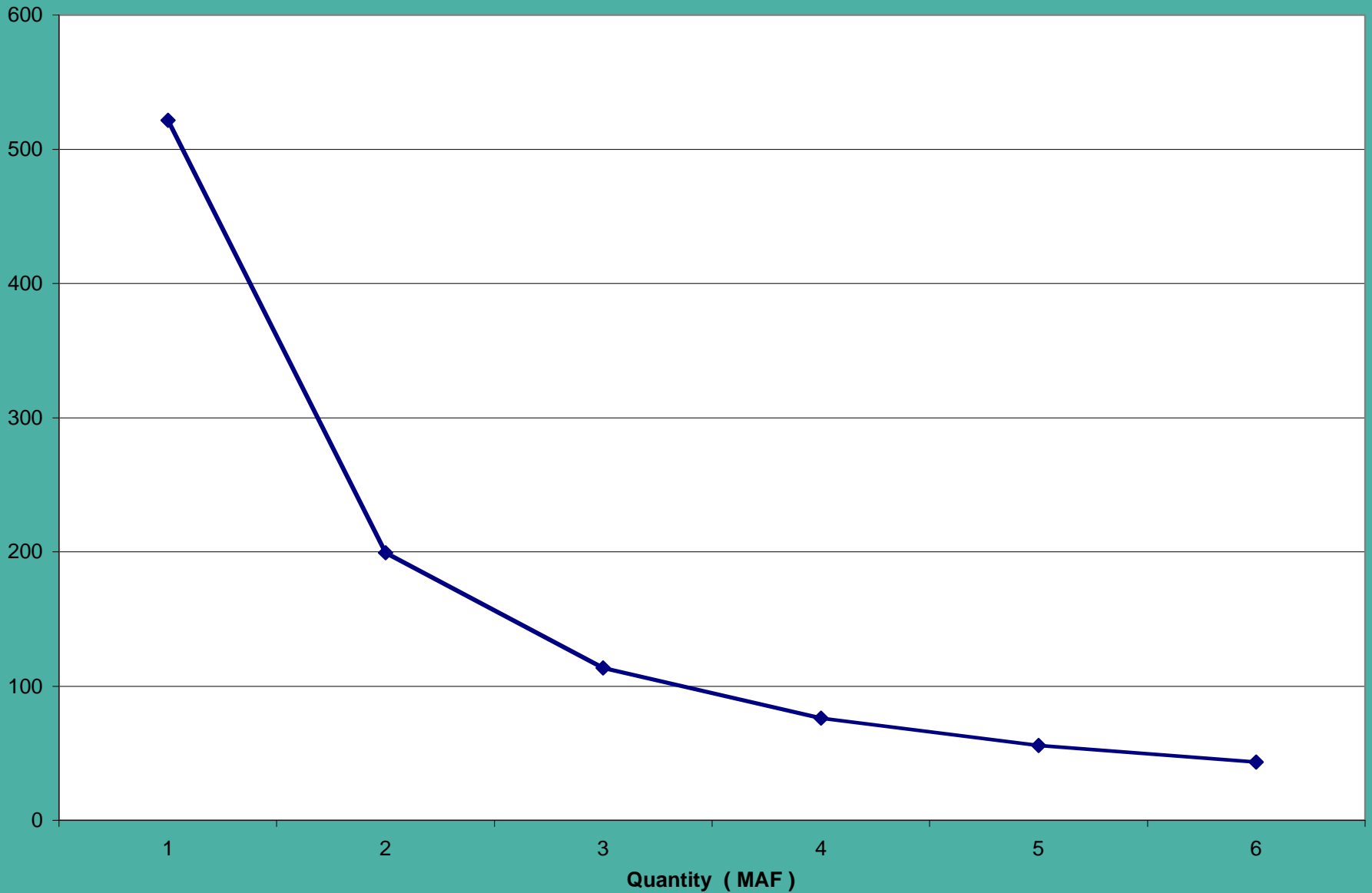
- Size the project to take advantage of the optimal capacity and decreasing unit cost.
- “Field of Dreams” pricing policy after the size and total cost is set.
- Problem— Users have no incentive to reveal their true willingness to pay.

# Factors to consider in IF Pricing

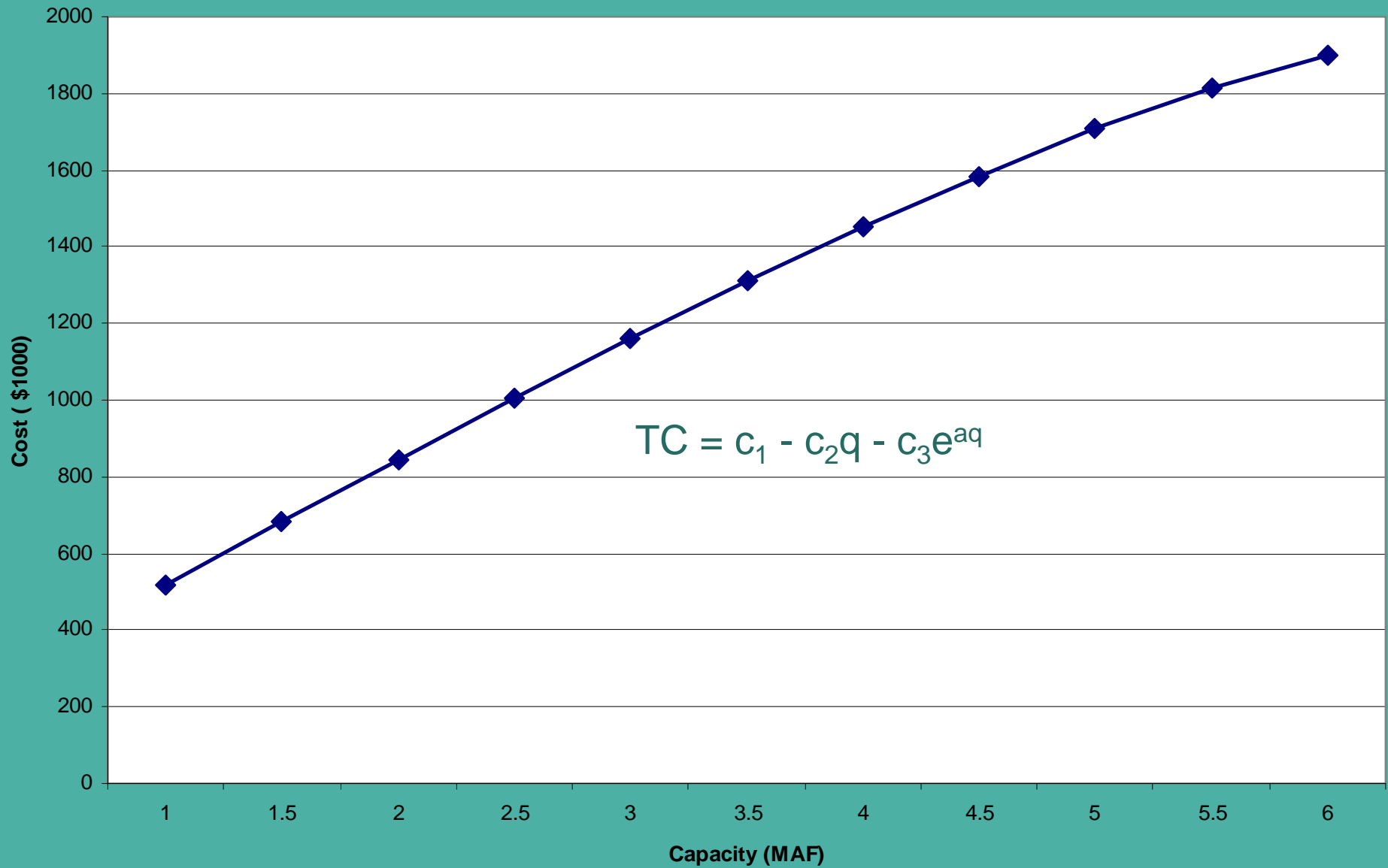
- Decreasing Marginal unit cost of capacity
- Different Demands and elasticities
- The IF has an Exceedence Curve that characterizes the reliability of supply.
- Supply reliability is a “joint product” with water quantity.



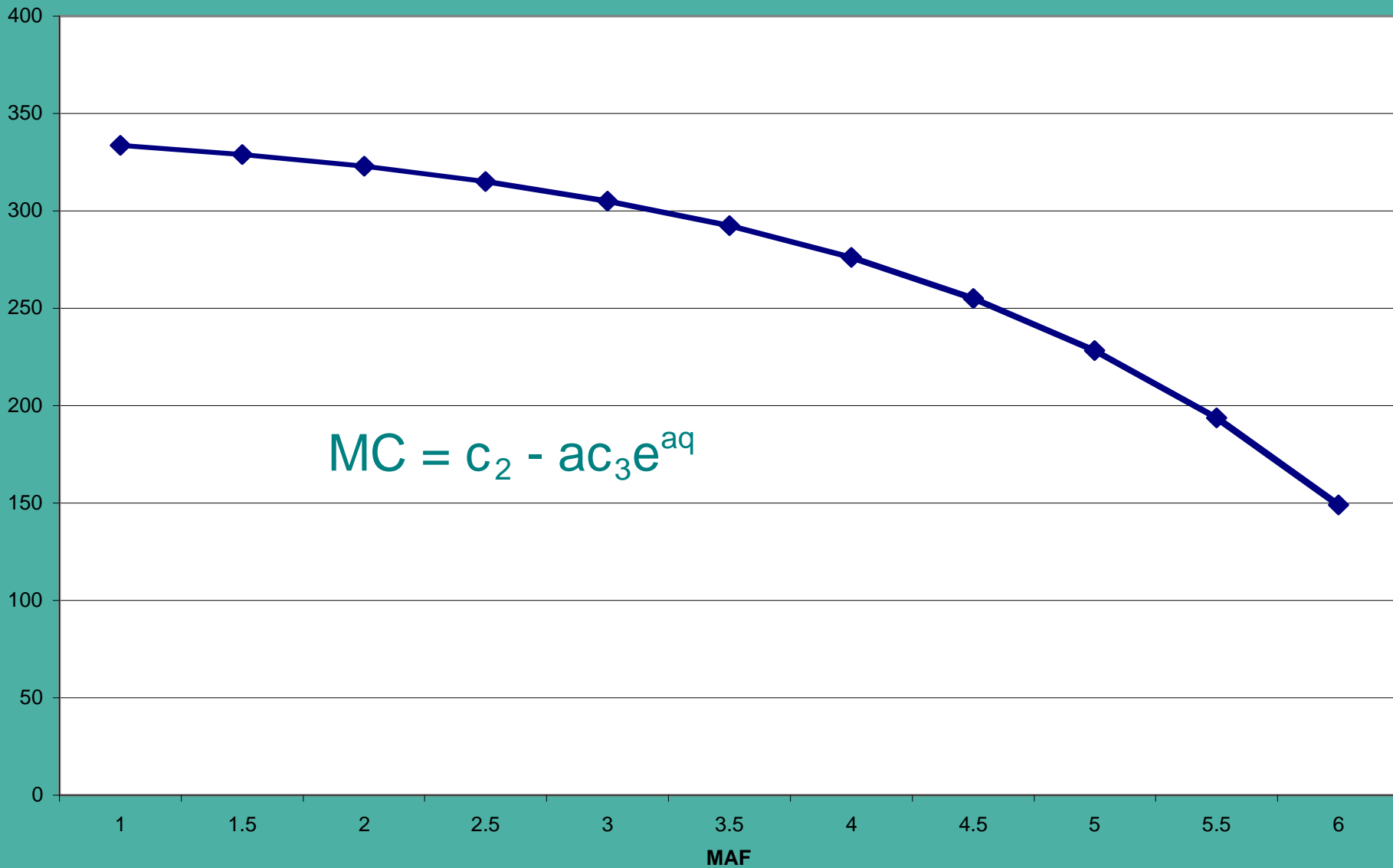
**Combined Agricultural/Urban Demand**



## Total Cost



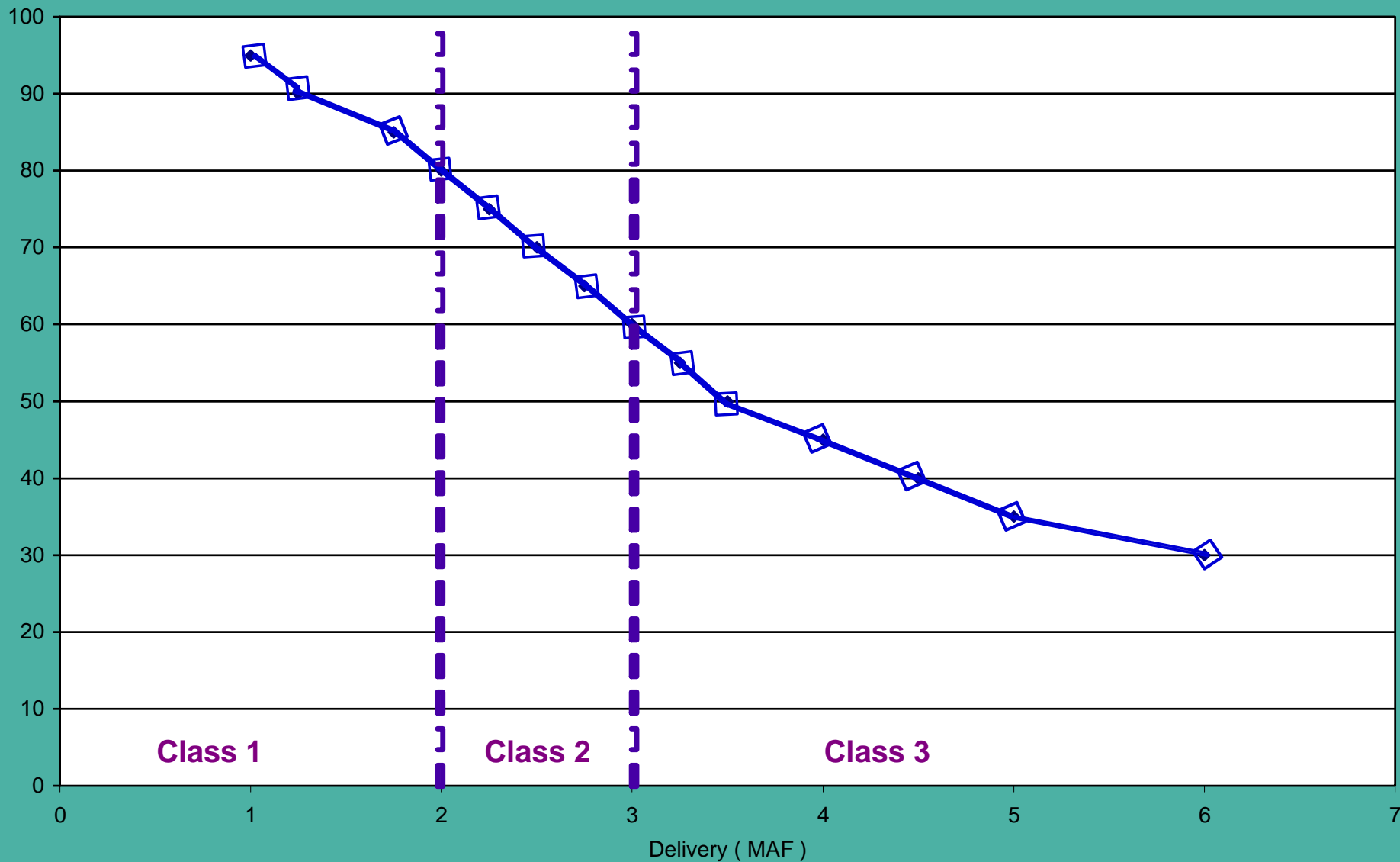
## Marginal Cost / AF Capacity



# An Alternative Approach

- Use the Exceedence curve to define three or more reliability classes of supply. (>80%, 79%-60%, 59%-30%)
- Define the average “public water” demand quantity and commit to pay the average cost, whatever it is.
- Use private bids and contracts to simultaneously price and size rights in the different reliability classes.
- Once the bids and facility size are final, allow trading of the private rights for each reliability class.

# Hypothetical IF Exceedence Curve



## A Simple example of Simultaneous Pricing and Sizing

Base Cost			
	Capacity	Total Cost	Annual Cost
	MAF	\$ Billion	\$ Million
	7.722	3.606	540.99
	Agriculture	Environment	Urban
Quantity	5.057	1	1.665
Price	26.44	70.06	202.54
50% Cost Increase			
	Capacity	Total Cost	Annual Cost
	MAF	\$ Billion	\$ Million
	7.106	5.288	793.33
	Agriculture	Environment	Urban
Quantity	4.516	1	1.59
Price	39.84	111.65	315.66

# Conclusions

- We can define an economic structure that is self financing, self sizing, and adaptable to future changes.
- We will have to break with traditional water project approaches.
- We should consider combining the State Water project conveyance capacity as a linked product with private IF capacity rights.